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CENTRAL FAX CENTER****NOV 27 2006****DEVICE ~~AND METHOD~~ FOR CLEANING A LANDSCAPE SURFACE**Related Application/Claim of Priority

[0001] This application is related to and claims priority from provisional application serial number 60/406,433, entitled "Device and Method for Cleaning a Landscape Surface", which application is incorporated by reference herein.

Background

[0002] The present invention relates to a device and method designed to clean a landscape surface of dirt and debris, while enabling landscape rock to be substantially maintained on the landscape surface as the landscape is being cleaned.

[0003] Landscape surfaces often include landscape rock, which is designed to enhance the look of the landscape surface, but over time may accumulate dirt and debris (e.g. from tree seeds, wind blown sources etc), which can detract from the look of the landscape surface. To manually clean the landscape surface, it may be necessary or desirable to rake or otherwise remove the entire layer of surface material, which can mean that a lot of the landscape rock gets removed as the landscape surface is cleaned. Even if the removed rock is then replaced, the process of separating the rock from the debris and dirt is tedious and time

consuming, and may only recover a modest amount of the landscape rock. Thus, the landscape rock may have to be regularly replaced with new rock.

Summary of the Invention

[0004] The present invention provides a cleaning device and method for cleaning a landscape surface of debris and/or dirt, which enables the landscape rock to be substantially maintained on the landscape surface as the landscape surface is being cleaned. This should result in less frequent need to replace the landscape rock.

[0005] An apparatus for separating debris from rock on a surface free of standing water is claimed. The apparatus comprises a power vacuum source, an elongated tubular intake portion with a first diameter having an open entrance end and an opposite end wall, an elongated tubular outlet portion of a second diameter smaller than the first diameter of the intake portion including an end portion extending through the end wall into fluid communication with the interior of the intake portion and an outlet end in communication with a vacuum source, the intake portion being of a length substantially greater than that of the outlet portion. Means for grasping the apparatus in the hands of a user to facilitate advancing in a slightly raised position above the surface to permit the introduction of air, debris and rock into the intake portion

whereupon any debris lighter than rock will be drawn upwardly through the outlet portion into the vacuum source and any rock lifted from the surface will return to the landscape surface.

[0006] Essentially, the cleaning device and method of the present invention provides for applying a vacuum to the landscape rock, in a manner that removes debris and dirt from the surface, but enables the landscape rock to be separated from the debris and dirt and redeposited on the landscape surface as part of the cleaning process. Thus, the landscape rock is essentially maintained on the landscape surface and the landscape surface is being cleaned of debris and dirt.

[0007] A cleaning device according to the present invention is configured for attachment to a vacuum source. The cleaning device has a conduit system with an intake portion and an outlet portion in fluid communication with each other. The outlet portion can comprise, e.g. a head assembly configured for attachment to a vacuum source with an outlet conduit formed in the head. The outlet conduit can comprise e.g. an elbow that is bent at a predetermined angle, so that the intake portion is in fluid communication with the outlet portion, and extends at a predetermined angle to at least part of the outlet portion. The intake portion and the outlet conduit are in fluid communication with each other, so that a vacuum applied to the outlet conduit is also communicated with the intake portion. The intake portion has

a distal end with an intake opening through which landscape material can be drawn into the intake portion from the surface of the landscape. The configuration of the intake and outlet portions of the conduit system is designed to (a) enable the intake portion to be conveniently held in a downward orientation with the intake opening disposed against the surface of the landscape, (b) allow dirt and debris to be drawn into the intake portion and transmitted through the outlet portion while restricting transmission of landscape rock through the outlet portion, and (c) provide a pressure state within the intake portion such that when the intake portion is lifted off the surface of the landscape, landscape rock in the intake portion will be deposited in situ on the surface of the landscape.

[0008] These and other features of the present invention will become further apparent from the following detailed description and the accompanying drawings and exhibits.

#### Brief Description of the Drawings

[0009] Figure 1 is a schematic, perspective illustration of ~~an~~ a device for use in cleaning a landscape surface, in accordance with the present invention;

[0010] Figure 2 is a schematic front view of the device of figure 1, in an upright position in relation to a landscape surface;

[0011] Figure 3 is a sectional view of the device of Figure 2, taken from the direction ~~A-A~~ 3-3; and

[0012] Figure 4 is an enlarged view of the area B 4 in Figure 2, with portions of the posts to which the stove bolts are connected broken away.

#### Detailed Description

[0013] As described above, the present invention relates to a method and device for cleaning a landscape surface. The principles of the invention are described below in connection with the cleaning of a landscape surface that includes landscape rock that forms a decorative part of the landscape, and dirt and debris that if left on the landscape surface would detract from the appearance of the landscape.

[0014] In the figures, the cleaning device 100 according to the present invention is configured for attachment to a vacuum source (shown schematically at 102 in Figure ~~2~~ 3). The power vacuum source 102 comprises a wet dry vacuum source or any other type of vacuum power source sufficient to create advancement of the debris

upwardly through the cleaning device 100. Specifically, the cleaning device 100 comprises a conduit system with an elongated tubular intake portion 106 and an elongated tubular outlet portion 108 in fluid communication with each other. The outlet portion 108 can comprise e.g. a head assembly ~~104~~with 104 with an integrally formed conduit 105 that is shaped as a bent elbow with respective inlet and outlet entrance and discharge portions 105a and 105b, respectively, that extend at an angle X relative to each other. The head assembly 104 also has a coupling structure, described more fully below, for coupling the head assembly to the intake portion 106, a hose coupling 109 configured for attachment to the vacuum source 102. When the intake portion 106 is attached to the head assembly 104, the intake entrance portion 106 is in direct fluid communication with the inlet portion 105a of the conduit 105, the entrance portion 105a extending centrally through an end wall 118a, and the intake portion 106 extends at a predetermined angle to the ~~outlet~~ discharge portion 105b of conduit 105. Since the conduit 105 is in fluid communication with the vacuum source 102 and the intake conduit 106, a vacuum applied to the conduit 105 is also communicated in communication with the intake portion 106.

[0015] The cleaning device has a pair of handles 110, 112. A rear handle 110 is connected with the head assembly 104. A front handle 112 is connected to a location on the head assembly 1054 that is near the junction of the head assembly and intake portion 106. The handles 110, 112 are preferably formed in one piece with

the head assembly 104, but can also be secured to the exterior of the cleaning device by any type of connection device (e.g. the handles can be bolted, strapped or otherwise secured to the cleaning device). Provision of more than one handle enables the cleaning device to be conveniently held by an operator in an advantageous position for cleaning a landscape surface 114, in the manner contemplated by the present invention. For example, handles 110, 112 facilitate advancement of the apparatus in a slightly raised position above a surface to permit the introduction of air, debris and rock into the intake portion 106. As shown in Figures 1, 2, and 3, the handle 110 extends parallel to the longitudinal axis of the intake portion 106 and handle 112 extends at an angle to it. Any debris lighter than rock will be drawn upwardly through the outlet portion 108 into the vacuum source 102 and any rock lifted from the surface will return to the landscape surface.

[0016] The intake portion 106 has a distal end 116 with an opening 118 through which landscape material can be drawn into the intake portion 106 from the surface of the landscape. When the cleaning device is being used to clean a landscape surface 114, the cleaning device is held by one or both handles 110, 112 in an orientation with the intake portion 106 oriented downward and the distal end 116 in close proximity to the landscape surface 114, so that the distal end 116 is essentially in contact with the landscape surface 114. The angle X that is formed in the conduit 105, and thereby extends between the intake and outlet portion is

preferably not more than 135 degrees. The angle X is more preferably about 75-135 degrees, and even more preferably about 90-105 degrees. Currently, it is preferred that the angle X is about 90 degrees. The device is preferably held in an upright position, so that the intake portion 106 extends essentially at 90 degrees to the landscape surface 114 (see Figures 2, 3). Moreover, the device is configured such that it can be conveniently lifted vertically from the landscape surface 114. The concept of the cleaning device being "lifted vertically" from the landscape surface means that the cleaning device can be lifted in a substantially vertically upward direction (as shown by the arrow 115 in Figures 2, 3), if the landscape surface is substantially level and horizontal (as schematically illustrated in Figures 2, 3), or if the landscape surface has a slight slope.

[0017] Additionally, as illustrated in Figure 3, the conduit 105 has a smaller inside diameter 119 than the inside diameter 121 of the inlet portion 106. Also, the hose coupling 109 in the head assembly has a tapered configuration, so that it can frictionally mate with a tapered coupling on a vacuum source, to frictionally couple the conduit 105 to a vacuum source. Thus, as the vacuum source 102 produces a low pressure in the conduit portion 105, air carrying dirt and debris is drawn into the intake portion 106 and through the conduit 105. The dirt and debris that is relatively small in mass is likely to be carried through the conduit 105 along with the fluid flow through the conduit 105. However, if any



landscape rock is drawn into the intake portion 106 along with the dirt and debris, the size and orientation of the intake portion 106 and the mass of the landscape rock makes it more difficult for the landscape rock to pass from the intake portion 106 to the conduit 105. Thus, such landscape rock is not likely to be carried through the outlet portion 108 as the air flows through the outlet portion 108 and carries with it the dirt and debris.

[0018] Thus, landscape rock that is drawn into the intake portion 106 is likely to remain in the intake portion 106 until the intake portion 106 is lifted up and off the landscape surface 114. When the intake portion is lifted straight upward from the landscape surface 114 (i.e. straight vertically in Figures 2 and 3), the pressure state in the cleaning device will be changed (i.e. it will go from a pressure state that caused the landscape rock to be drawn into the intake portion 106, to a pressure state that causes landscape rock in the intake portion 106 to fall by gravity out of the intake portion 106). Since the intake portion 106 is lifted vertically off the landscape surface 114, the landscape rock in the intake portion 106 should be substantially redeposited in situ onto the landscape surface 114.

[0019] Accordingly, the configuration of the intake and outlet portions of the cleaning device is designed to (a) enable the intake portion 106 to be conveniently held in a downward orientation with the intake opening 118 disposed against the

landscape surface 114, (b) allow dirt and debris to be drawn into the intake portion 106 and transmitted through the outlet portion 108 while restricting transmission of landscape rock through the outlet portion, and (c) provide a pressure state within the cleaning device such that when the intake portion 106 is lifted off the landscape surface 114, landscape rock in the intake portion 106 will be deposited in situ on the landscape surface 114.

[0020] As explained above, the currently preferred version of the device (Figure 1) has an intake portion 106 oriented at about 90 degrees to the outlet part 105b of the conduit 105, and the opening 118 is configured such that when the intake portion 106 is held at about 90 degrees to the landscape surface, the opening 118 can be disposed directly against the landscape surface 114. This helps maintain a favorable pressure gradient within the cleaning device as material (e.g. dirt and debris) from the landscape surface is being drawn into the cleaning device.

[0021] The head assembly 104 is configured to be conveniently coupled to the intake portion 106. The head assembly 104 has an outer skirt 120 that is configured to receive the upper end of the intake portion 106. The outer skirt 120 has slits at select locations, to form the skirt into sections that are flexible enough to be clamped (tightened) against the intake portion. In the figures, a pair of slits 124, 126 are shown in the skirt 120, and cause skirt sections 120a and 120b to be formed in the skirt 120.

The skirt sections are flexible enough to be clamped (tightened) against the intake portion. The skirt sections have posts that are formed in one piece with the skirt sections (see e.g. posts 130 in Figures 3, 4) and fasteners such as stove bolts 132 and nuts 134 (Figure 4) that are tightened against the posts 130, to enable the skirt sections to be clamped (tightened) against the intake portion 106. The head assembly 104 also includes an end portion 113 extending centrally through an end wall 118a into fluid communication with the interior of the intake portion 106.

[0022] The cleaning device is preferably made of materials that are as lightweight as possible, to enable the cleaning device to be manipulated by hand, but both sturdy and rugged enough to enable the device to be coupled to a vacuum source, and to withstand the environmental conditions of the outdoor environment in which the device is expected to operate. For example, the intake portion 106 of the conduit can be made of polypropylene; the head assembly 104 with the handles 110, 112, the skirt 120 and the conduit 105 can be formed in one piece from ABS plastic. Of course, other suitable materials will also become apparent to those in the art.

[0023] Also, the current, preferred dimensions for the various components are determined by the particular application for which the device of the present invention is configured. As shown in Figure 3, the intake portion 106 has a constant inner diameter 121 and the outlet portion 108 has a smaller constant diameter 119.

For example, a smaller version of the cleaning device of the invention, which would be e.g. for home use, would include an intake portion 106 with an inner diameter 121 from 3.75 inches to 4.75 inches, an outer diameter tube enables the head assembly to be conveniently clamped (tightened) against the intake portion, a head assembly 104 with a conduit 105 having an inner diameter 119 of about 2 inches, and a bend X in the conduit 105 of up to 135 degrees (90 degrees is currently preferred), and a tapered hose coupling 109 that will conveniently attach to the vacuum source (a wet/dry vacuum of about 16 gallons capacity generally has a 2 inch inside diameter hose coupling). The reason the range of the inner diameter works best with larger mass landscape materials, and a larger inner diameter works best with lighter mass landscape material. A larger version of the device of the invention (intended more for commercial use) would include, e.g., an intake portion 106 with an inner diameter 121 of about 6 inches, and a head assembly 104 with a conduit 105 having an inner diameter 119 of about 3 inches. The bend X in the conduit 105 would be similar to the bend in the smaller version. In either version, it is contemplated that the inner diameter 119 of the conduit 105 will be smaller than the inner diameter 121 of the intake portion 106. This results in an acceleration of the air flow in the outlet portion 108, encouraging rocks and debris to pass upwardly along the flow passage 120. End wall 118a acts as a deflection surface

preventing rocks from entering the outlet portion 108. In addition, it is contemplated that the vacuum source 102 would be a wet/dry vacuum source. Also, the height of the intake portion 106 will be designed such that the cleaning device can be conveniently held by an operator with the intake portion 106 in a vertical position relative to the landscape surface 114, and such that the cleaning device can be conveniently lifted vertically from the landscape surface. Necessarily, the intake portion 106 is of a length substantially greater than that of the outlet portion 108. The combination of the intake portion 106 and the outlet portion 108 is of a length to extend to the waist level of a user.

[0024] Additionally, while a head assembly with a bent elbow for the outlet is currently preferred, it may be possible to practice the present invention with an outlet that is bent in a different form, or even an outlet that is not bent.

[0025] Accordingly, the foregoing description provides a device and a method for cleaning a landscape surface in a manner designed to remove dirt and debris from the landscape surface, while enabling landscape rock to be maintained substantially in situ on the landscape surface. With the foregoing disclosure in mind, it is believed that various applications of the principles of the

invention, to provide a device and method for cleaning a landscape surface, will become apparent to those in the art.